

What is Claimed is:

1. A surge relief valve comprising:

a main valve body comprising a dome port and an inlet port, wherein said inlet port is in fluid communication with a first fluid;

a dome reservoir connected to said main valve body via said dome port and arranged to hold a second fluid;

a piston located in said main valve body and comprising a piston in fluid communication with said reservoir, wherein said first fluid exerts an upward force on said piston, said second fluid exerts a downward force on said piston, and said piston is arranged to move in response to a differential in said upward and downward forces, wherein said first and second fluids are isolated from one another.

2. The surge relief valve of Claim 1 wherein said main valve body further comprises an outlet port, wherein said piston is arranged to control fluid communication between said inlet port and said outlet port.

3. The surge relief valve of Claim 2 wherein said outlet port is substantially perpendicular to said inlet port.

4. The surge relief valve of Claim 2 wherein said piston is arranged to provide fluid isolation between said inlet and outlet ports when said downward force is greater than said upward force and to enable fluid communication between said inlet and outlet ports when said upward force is greater than said downward force.

5. The surge relief valve of Claim 4 wherein a degree of fluid communication between said inlet and outlet ports is proportional to said differential in said upward and downward forces.

6. The surge relief valve of Claim 1 wherein said second fluid is at a specified pressure; and, said surge relief valve further comprises a self-relieving regulator connected to said main valve body and in fluid communication with said piston volume, wherein said self-relieving regulator is arranged to control said second fluid specified pressure.

7. The surge relief valve of Claim 6 wherein said self-relieving regulator is arranged to maintain said second fluid specified pressure at a predetermined value in response to changes in an ambient temperature.

8. The surge relief valve of Claim 1 wherein said first fluid is a liquid.
9. The surge relief valve of Claim 8 wherein said liquid is oil.
10. The surge relief valve of Claim 8 wherein said oil is petroleum oil.
11. The surge relief valve of Claim 1 wherein said second fluid is a gas.
12. The surge relief valve of Claim 11 wherein said gas is selected from the group consisting of nitrogen and air.
13. The surge relief valve of Claim 1 wherein said dome reservoir further comprises a first reservoir port and said dome reservoir is mounted directly to said main valve body with said first reservoir port in substantial alignment with said dome port.
14. The surge relief valve of Claim 1 further comprising:
 - a piping arrangement with a first end connected to said dome reservoir and a second end connected to said dome port and arranged to provide said fluid communication between said dome reservoir and said piston.
15. The surge relief valve of Claim 14 wherein said reservoir dome is mounted to said main valve body.
16. The surge relief valve of Claim 14 wherein said reservoir dome is remote from said main valve body.
17. A method for relieving pressure in a fluid-containing space comprising:
 - exerting an upward force on a piston in a relief valve connected to a fluid-containing space, wherein said upward force is generated by a first fluid in said fluid-containing space;
 - exerting a downward force on said piston, wherein said downward force is generated by a second fluid in a dome reservoir connected to said relief valve; and,
 - moving said piston in response to a differential between said upward and downward forces.
18. The method of Claim 17 wherein moving said piston further comprises controlling a release of said first fluid from said fluid-containing space.
19. The method of Claim 18 wherein said relief valve comprises an inlet connected to said fluid-containing space and an outlet substantially perpendicular to said inlet; and,

wherein controlling a release of said first fluid from said fluid-containing space further comprises controlling a release of said first liquid through said inlet to said outlet.

20. The method of Claim 18 wherein controlling a release of said first fluid further comprises preventing said release when said downward force is greater than said upward force and enabling said release when said upward force is greater than said downward force.

21. The method of Claim 20 wherein enabling said release further comprises enabling an amount of said release proportional to said differential in said upward and downward forces.

22. The method of Claim 17 wherein said second fluid is at a specified pressure; and, said method further comprises controlling said specified pressure.

23. The method of Claim 22 wherein controlling said specified pressure further comprises maintaining said specified pressure at a predetermined value in response to changes in an ambient temperature proximate said relief valve.